

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) IMPROVEMENTS IN OR RELATING TO CABINETS. PARTICULARLY FOR ELECTRICAL INSTALLATIONS

- (71) We, SPRECHER & SCHUH AG., a Body Corporate organised under the Laws of Switzerland, of 7, Buchserstrasse, Aarau, Aargau, Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—
- 10 The present invention relates to a cabinet, particularly for electrical installations.
- Such cabinets serve mainly for accommodating electrical switchboards and distributing plants. They comprise a skeleton frame with supporting elements for securing built-in units, as well as lining walls, doors, lids, etc.
- Such a cabinet may for example be of welded construction, a frame composed of welded angle sections carrying screwed-on encasing sheets forming a closed box provided with internal auxiliary supports to which the switching and/or distributing elements are anchored at the appropriate locations by means of screws or other fixing elements. The fittings for doors, lids, slide-in units and the like are provided as required and, according to the available workshop facilities, are fixed to the skeleton frame by welding, riveting, screwing or the like. In order to be able to change the position of the built-in units, elongated holes are usually provided which, however, do not permit a stepless change in position. Such constructions are expensive in the case of small scale production; they are moreover not very adaptable to subsequent changes and are also aesthetically unsatisfactory. Since they are varnished before the built-in units are assembled, the layer of varnish or paint is usually damaged during assembly and a subsequent coating is again necessary in order to avoid the formation of rust.

A further known embodiment consists of sheet metal with integral supporting sections produced by bending the sheets, and of reinforcements. These sheets are connected by welding, screwing or the like. Their drawback consists in the lacking adaptability to the external shape.

Recently cabinets with a skeleton frame composed of light metal sections are proving successful, the sections being screwed to one another by means of corner brackets. For accommodating different built-in units, longitudinal supports, cross supports or like holding elements are screwed to the frame. The connection of the individual profiled bars and sections requires much professional expenditure and is correspondingly expensive, particularly when additional built-in units are to be inserted later.

In summary, it may be said for the above-mentioned known types of construction, that their production requires a high expenditure of work and tools and above all they cannot be adapted to different built-in units without requiring additional work. As has already been mentioned, a further drawback of the constructions composed of steel is the fact that the layer of paint may be damaged during assembly.

In another known cabinet for electrical installations clamping means are provided for the stepless adjustment of the position of the cross and longitudinal supports for the installations in the skeleton frame. However, the clamping joints used for this purpose have the considerable drawback that they only provide a poor connection. The clamped elements are held together exclusively by friction contact. Under extra heavy loads, mainly during transport, vibration and unsatisfactory assembly, individual elements may become detached, there is the danger of distortion of the cabinet and the unity of the construction may be en-

dangered.

The present invention has for its object the provision of an improved cabinet for electrical installations, which cabinet is able to be produced from a small number of different sections, with great accuracy to gauge, with low working expenditure — even in the case of small scale and single piece production — and simple tools only are required for assembling the components. Furthermore, the improved cabinet makes possible a stepless displacement of the position of the individual carrying and fixing elements for the built-in units, also at a later stage when the cabinet is already in use. A subsequent finishing treatment of the individual elements is not necessary and larger plants can be assembled by a plurality of individual cabinets which can be joined economically, pleasingly and technically satisfactorily.

The cabinet according to the invention comprises a skeleton frame having front, rear and lateral sides, and hollow profiled horizontal and vertical supporting elements, said vertical supporting elements including each a plurality of outwardly open recesses and a laterally projecting channel member extending the length of the vertical element, said horizontal supporting elements including hollow profiled members extending at the front and rear sides of the frame between two vertical supporting elements and including threaded bores extending lengthwise thereof, said bores receiving screw members introduced through holes provided in said vertical supporting elements for fixing the horizontal supporting elements at the front and rear sides of said frame to the vertical supporting elements, said skeleton frame also comprising side supports fixed to the laterally projecting channel members of corresponding front and rear vertical supporting elements.

A preferred embodiment of a cabinet according to the invention is illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a perspective view of the skeleton frame of the cabinet according to the invention;

Figure 2 is a cross section of a vertical supporting section of the frame;

Figure 3 is a perspective view of the connecting means for fixing a vertical supporting section to a head support;

Figure 4 is a perspective view, partly drawn in section of the manner of assembling, a vertical supporting section with a horizontal bottom support;

Figure 5 is a perspective view of two vertical supporting sections and their connections to an upper side carrier element;

Figure 6 is a perspective view of a vertical supporting section having a lining

element fixed thereto, and

Figures 7 and 8 show the manner of fixing of various fittings and connecting elements to a vertical supporting section.

The skeleton frame of a cabinet for electrical installations, shown in Fig. 1, has four vertical supporting elements or sections 1, which form the vertical boundary edges of the cabinet. These vertical sections are connected together at the top and bottom by two head supports 2 and two bottom supports 3 on the front and rear sides of the frame, and by a total of four side members 4 on the two lateral sides of the frame.

Figure 2 shows a cross-section through a vertical element 1. This element is a hollow light metal extruded section having an outer contour with a plurality of re-entrants or outwardly open recesses 6, 7, 8, 11 and 12. The part of the section 1 surrounding the cavity 5 has two grooves 6 and 7 which serve to receive corresponding convex parts of covering and fixing elements or fittings described hereinbelow. Between the two grooves 6 and 7 is located another groove 8 into which a packing strip may be inserted, when two cabinets are to be connected together on this side of the section 1 or when a cabinet abuts against any other surface.

On the opposite side of the section 1 is located an open channel-shaped section 9, which, as will be explained later, may receive nuts for fixing the side members 4. The outer face 10 of the channel section 9 is provided with a groove 11 preferably for receiving a sealing strip 11', as well as with a rabbet 12 for receiving an edge of a metal sheet of a lining element 12'.

Figure 3 shows the means for connecting a vertical section 1 to a head support 2. The latter also is formed by a hollow extruded section of light metal, preferably an aluminium alloy, and is provided with a substantially pentagonal, prismatic cavity 13 as well as with two bores 14 of circular cross sections, and further with a U-shaped flange or ledge 15 on the underside. The outer surface 16 is plane; two further plane faces 17 and 18 form the upper closure of the section.

For connecting the head support 2 to the vertical section 1, the head support is cut out on its end face as shown at 2' in Fig. 3. The depth of the cut-out portion corresponds in the longitudinal direction of the section 2 to the width of the vertical section in this direction; transversely hereto, the cut-out is so deep that the axes of the bores 14 of the head support are situated in the centre of the substantially square part of the vertical section 1. A filler plug 19 of square cross-section having chamfered longitudinal edges and a continuous longitudinal bore 20 is located in the cavity 5 of the

vertical section, a screw thread 21 being cut into the upper part of the bore 20 for receiving an eye bolt for transporting the frame. Moreover, the filler plug 19 is provided with two transverse bores 22, the lower one of which is visible in Fig. 3 in the lower part of the plug 19 which has been shown in section. The axes of the transverse bores 22 coincide with those of the bores 14 in the head support 2. Two screws 23 having an internally hexagonal screwhead connect the vertical section 1 with the head support 2, to which end a corresponding thread 24 is cut in the bores 14. The bore 22 is sunk at its outer end and has a somewhat larger diameter than the diameter of the circular head of the screw 23, the head of the screw when tightened being flush with the outer face of the vertical section.

In similar manner the vertical sections are connected to the ends of the bottom supports 3. Fig. 4 shows such a connection. The support 3 is also an extruded hollow section of light metal, having a cavity 25 and two longitudinal bores 26 of circular cross section. On the upper side of the support 3 is located a U-shaped flange 27, and the underside is provided with a shallow rabbet 28 adapted to engage over an adjoining floor covering 29. The connection of the support 3 to the vertical section is effected, like the top supports, by means of two screws 30 having an internally hexagonal head, but without the intermediary of a filling plug, since the lower connection is only comparatively slightly loaded. The upper connection must, on the other hand, take up the entire share of the weight acting on a vertical section, thus a quarter of the weight in the case of four sections and four eyebolts thereon. The screws 30 are inserted through bores 31 in the outer face of the vertical section 1.

The connection of the side supports 4 with the vertical sections is illustrated in Fig. 5. The side supports consist of commercially available rolled or bent steel U-sections. Each end of a U-section is provided at both ends with a bore 32 and with two guide lugs 33 and 34, formed by cutting out and outwardly bending two tongues engaging the longitudinal slots 35 in the vertical sections 1. Each bore 32 receives a screw 36 with an externally hexagonal head and a washer 37, which screws are screwed into threaded nut plates 38 engaged in the channel section 9 (see also Fig. 2) and thus press the side supports 4 firmly against the vertical sections 1. The nut plates 38 may be inserted from the upper open end of the channel section 9, but more advantageously through one of a plurality of lateral slots 39, namely through that slot situated next to the point of

fastening provided for the side members of other carrying elements or fittings intended for receiving built-in units.

Fig. 6 shows how a panel element serving for encasing can be connected to the vertical sections 1. The panel element is an extruded profiled web 40 of light metal, preferably an aluminium alloy. This profiled web can be part of a front structure projecting forwardly from the front plane of the frame, for receiving indicating instruments or actuating and switching means. The cabinet may thus be lined above and below the web 40 with decorative panels.

At the point of connection, the profiled web 40 has a groove 41, a projecting ledge 42 engages in the groove 6 of the vertical section 1, on the rear side of which a profiled plate 44 having a projecting ledge 45 engages in the second longitudinal groove 7 of the vertical section 1. The upper part of the profiled plate 44 is thickened and offset and has a groove 46 for receiving a metal sheet, a plate or a sealing member according to the actual requirements. Screws 47 with washers 48 serve to fix the profiled web 40 to the upright. The screws are inserted in the profiled plate through holes 48a in the plate 44 and are screwed into threaded holes (not shown) in the profiled web 40, whereby the profiled web 40 and the profiled plate 44 are clamped fast to the vertical section 1.

Fig. 7 shows the manner of fastening on a vertical section 1 a hinge part 49 for a door. Such a hinge part is cut according to measure from a hollow extruded section composed of an aluminium alloy and is clamped to the upright in the same manner as the profiled web 40 shown in Fig. 6 by means of the profiled plate 44 and screws 47. A T-shaped sealing strip 50 is inserted in the groove of the profiled plate 44, against which strip the wing of the door, not shown, can sealingly abut. The hinge part 49 comprises a flange 56 having a hook-shaped end portion 57 engaging the groove 6 of the vertical section 1.

Further examples of fastening possibilities to the front or rear side of a cabinet are shown in Fig. 8. Fittings 51 and 52 consist of a section having a resilient clamping wing 53 which has the function of the profiled plate 44 in the embodiments according to Figs. 6 and 7. For clamping purposes, the wing 53 is braced with the screws 47 against the vertical section 1.

The lower fitting 52 is provided with a notch 54 and a threaded hole 55 for the purpose of fixing any built-in unit; the upper fitting 51 is again formed by a hinge part fixed to the frame.

Cabinets or cells produced according to the mode of construction described may not only be used individually but any desired

number thereof may be combined with one another. In the first case, the side walls and possibly also the rear wall will be encased by panels or the like. When assembling together plants consisting of a plurality of cabinets, the meeting side walls do not need to be encased, but may be connected while directly joining each other. To this end, for example, as may be seen from Figs. 3 and 4, circular notches 57 and bores 58 for screw nuts are distributed over the length of the vertical section 1, by means of which the cells can be connected to larger units. For sealing or for absorbing vibrations, elastic sealing strips inserted in the groove 11 of the vertical section (see Fig. 2) are advantageously used which strips prevent a metallic contact between the joined cabinets. The mentioned U-shaped webs 15 of the head supports 2 and 27 of the foot supports 3 may serve as supports for the edges of lining panels or the like, if desired with the interposition of a sealing strip in the groove of these webs.

The described constructional elements ideally fulfill the requirements mentioned at the beginning of the specification. With only a few types or profiles of light metal sections, there are many possibilities of configuration and combinations, the dimensions of the individual cabinets being practically freely selectable and the cabinet space may be subdivided as desired. Storage is simplified, as well as the expenditure for tools. Since the most important elements consist of light metal, varnishing is as a rule superfluous and other surface preserving means, such as anodic treatment, are generally only necessary when using the cabinets in chemical plants.

WHAT WE CLAIM IS:—

1. A cabinet, particularly for electrical installations comprising a skeleton frame having front, rear and lateral sides, and hollow profiled horizontal and vertical supporting elements, said vertical supporting elements including each a plurality of outwardly open recesses and a laterally projecting channel member extending the length of the vertical element, said horizontal supporting elements including hollow profiled members extending at the front and rear sides of the frame between two vertical supporting elements and including threaded bores extending lengthwise thereof, said bores receiving screw members introduced through holes provided in said vertical supporting elements for fixing the horizontal supporting elements at the front and rear sides of said frame to the vertical supporting elements, said skeleton frame also comprising side supports fixed to the laterally

projecting channel members of corresponding front and rear vertical supporting elements.

2. A cabinet according to claim 1, in which said vertical and horizontal profiled supporting elements are extruded light metal sections, the vertical supporting elements having a closed cavity and outwardly open recesses in the form of grooves receiving encasing elements, fittings and sealing means, the horizontal supporting elements at the front and rear sides of the frame having a longitudinally extending cavity of substantially prismatic shape and carrying ledges or flanges of U-shaped cross section for supporting encasing elements and sealing strips.

3. A cabinet according to claim 2, in which a reinforcement plug is inserted into the closed cavity at the upper end of the vertical supporting elements.

4. A cabinet according to any preceding claim, in which the horizontal supporting elements at the two opposite lateral sides of the frame are formed by U-section steel rails having the two branches of the U-section directed towards the interior of the cabinet and the web thereof being provided with holes for fixing the U-section to the vertical supporting elements, said web being provided with tongues at both sides of said holes, said tongues being bent out into said laterally projecting channel members, which are provided with slots for inserting nut plates into the channel members, and fixing screws inserted through said holes and screwed into said nut plates.

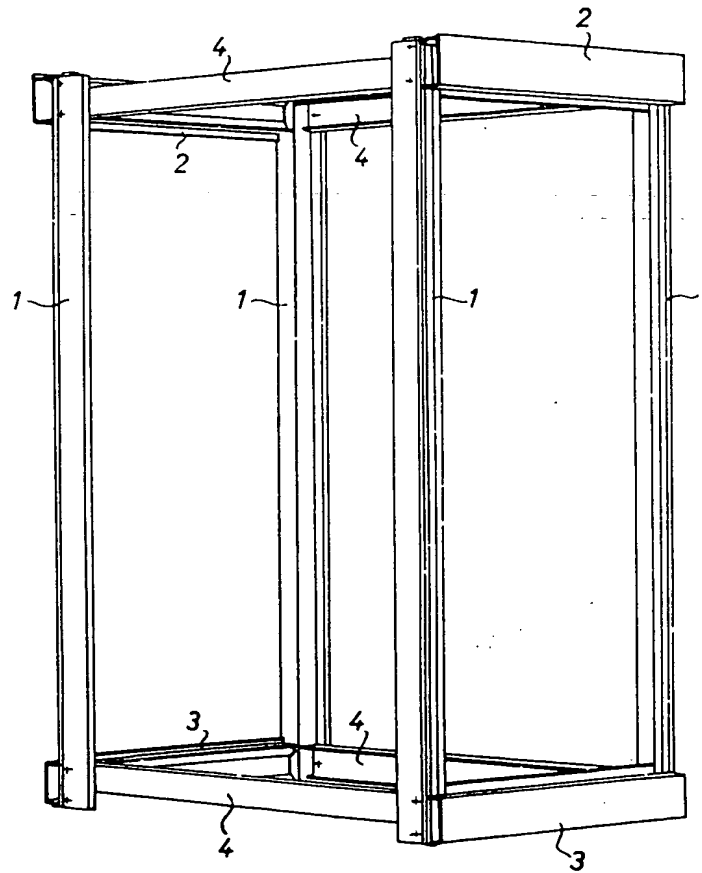
5. A cabinet according to any preceding claim, and comprising extruded encasing sections and fittings having a web with a hook-shaped end portion engaging into one of said outwardly open recesses of the vertical supporting element, and profiled plates having a hook-shaped longitudinal edge engaging into another one of said outwardly open recesses of the vertical supporting element, said profiled plates and said encasing elements and fittings being braced by screws against the vertical supporting elements.

6. A cabinet, particularly for electrical installations, constructed and arranged substantially as described herein with reference to, and as illustrated in, the accompanying drawings.

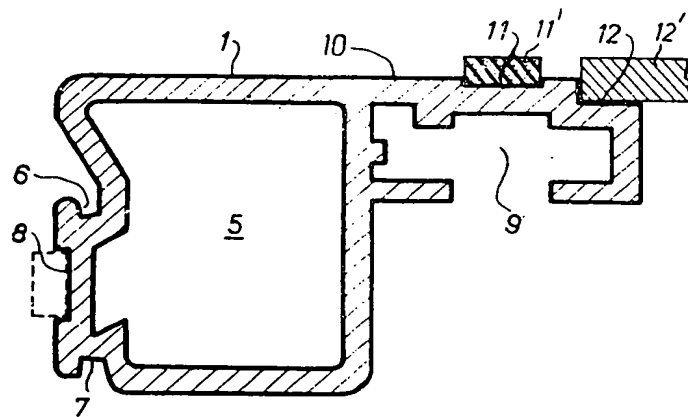
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Fig.1

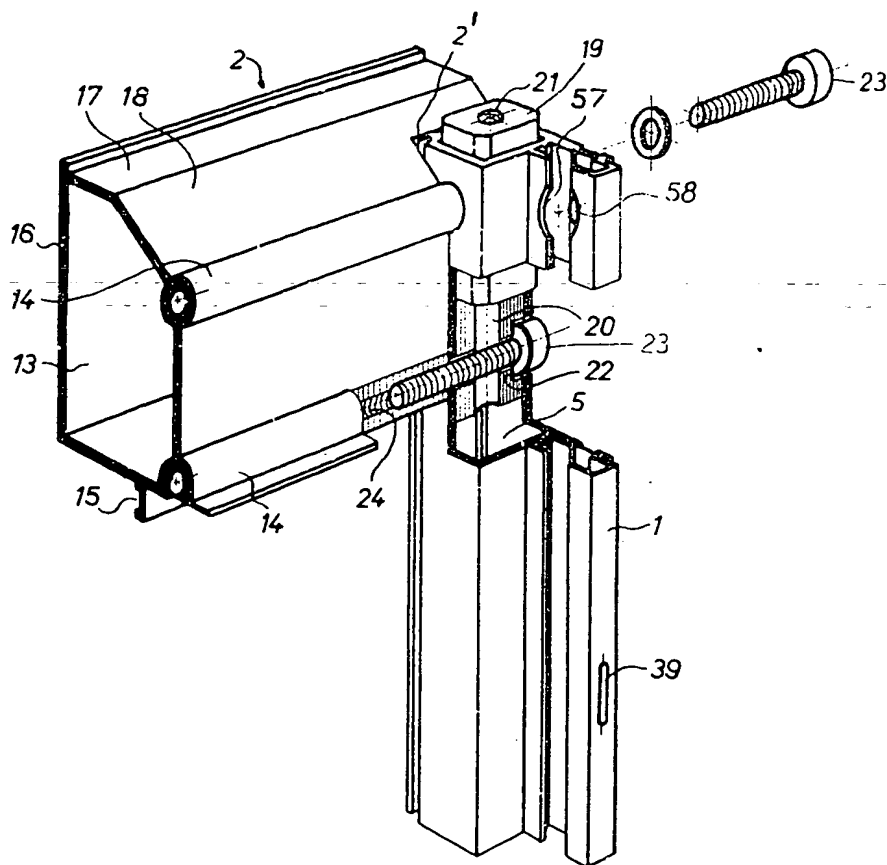


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Fig. 2

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Fig. 3



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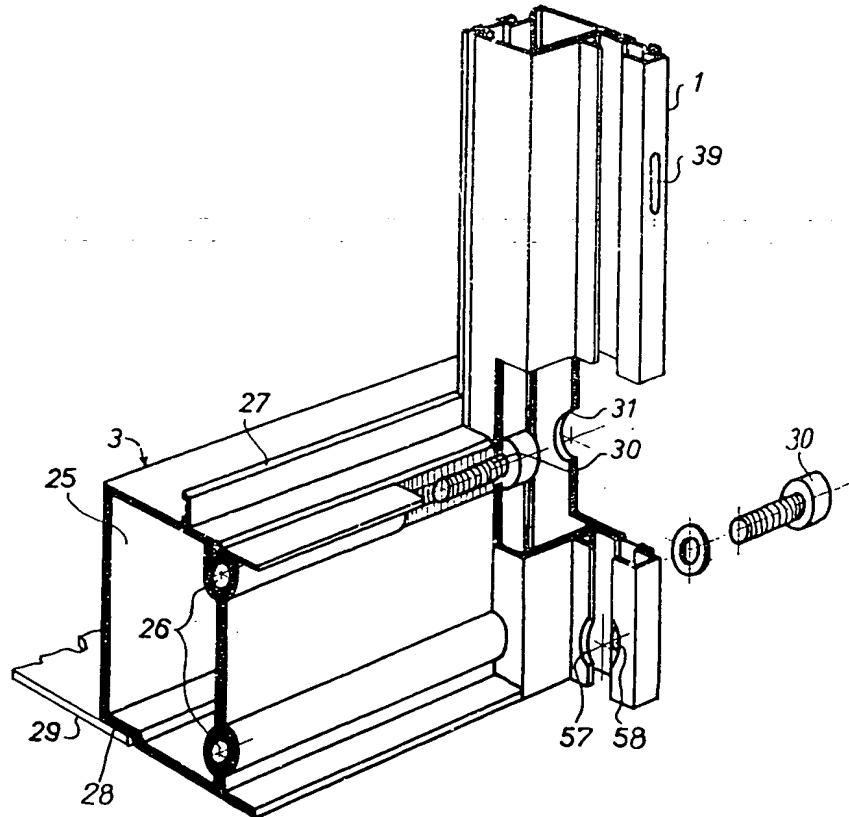
COMPLETE SPECIFICATION

8 SHEETS

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Sheet 4

Fig.4



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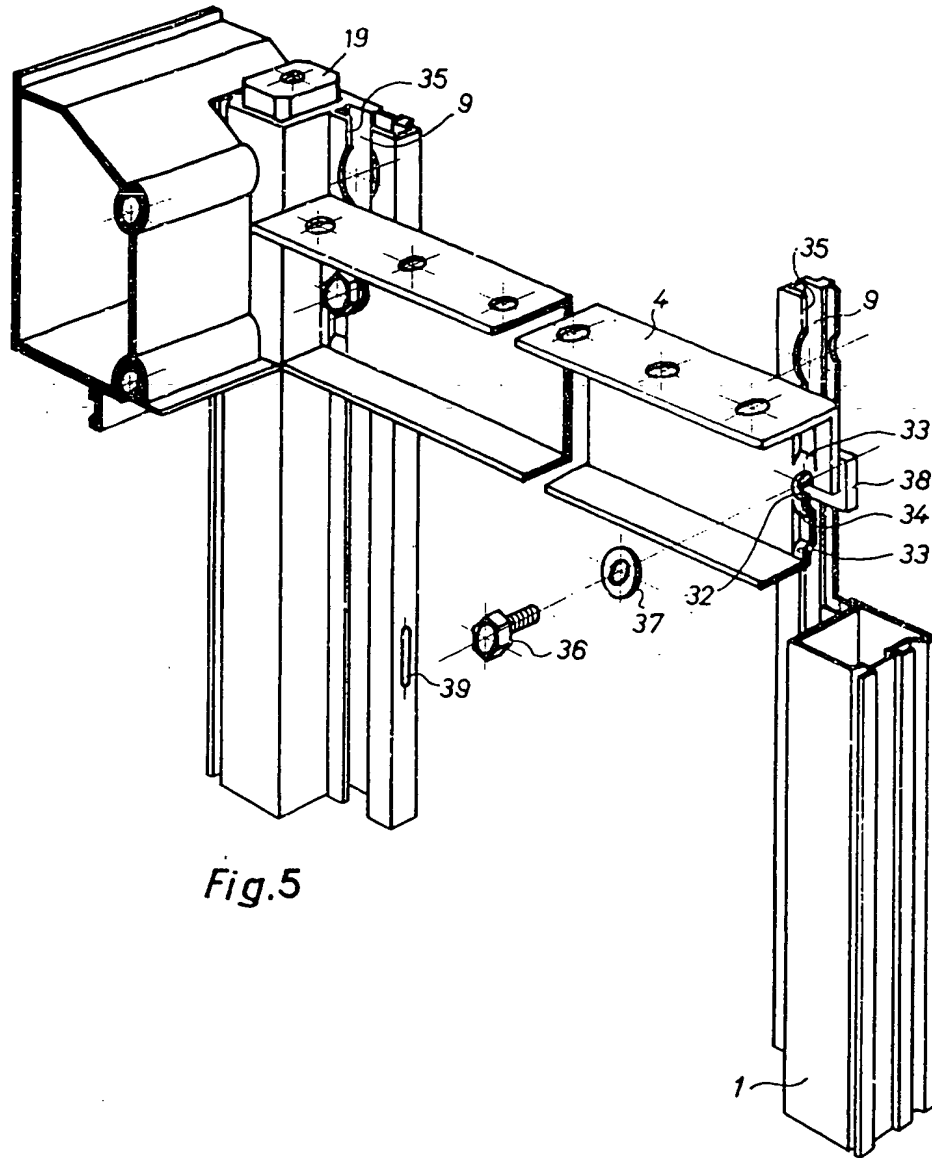
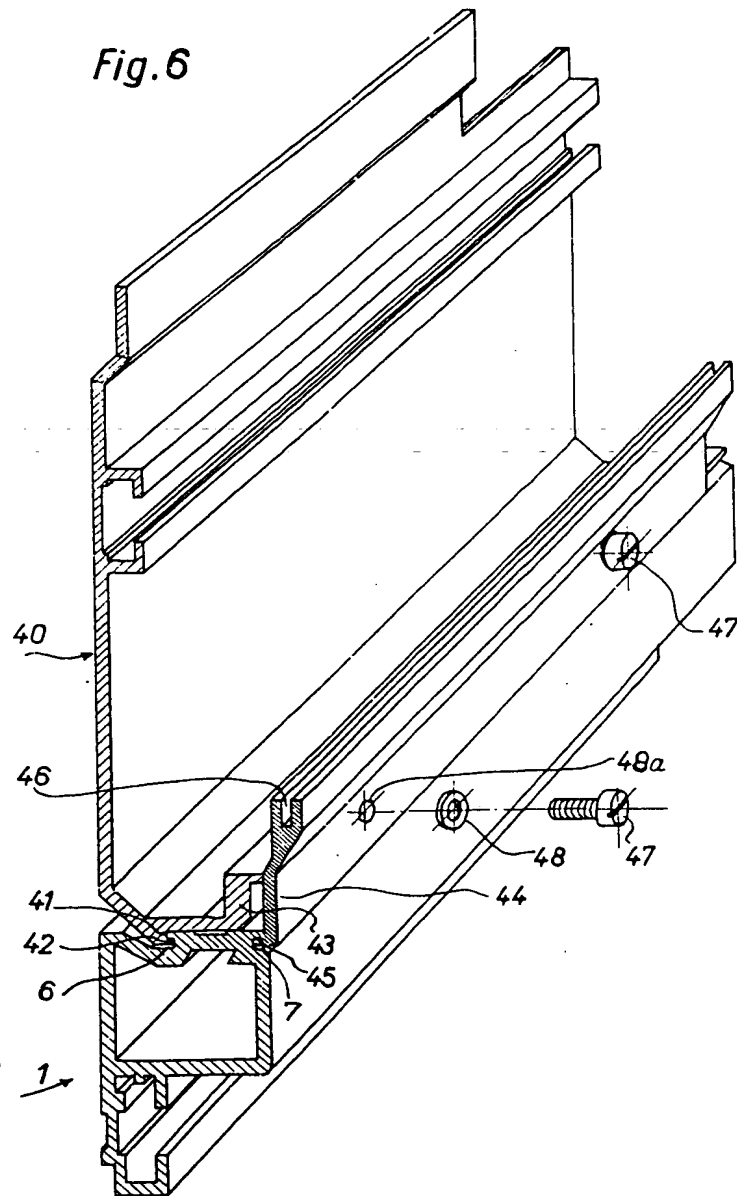


Fig.5

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Fig. 6



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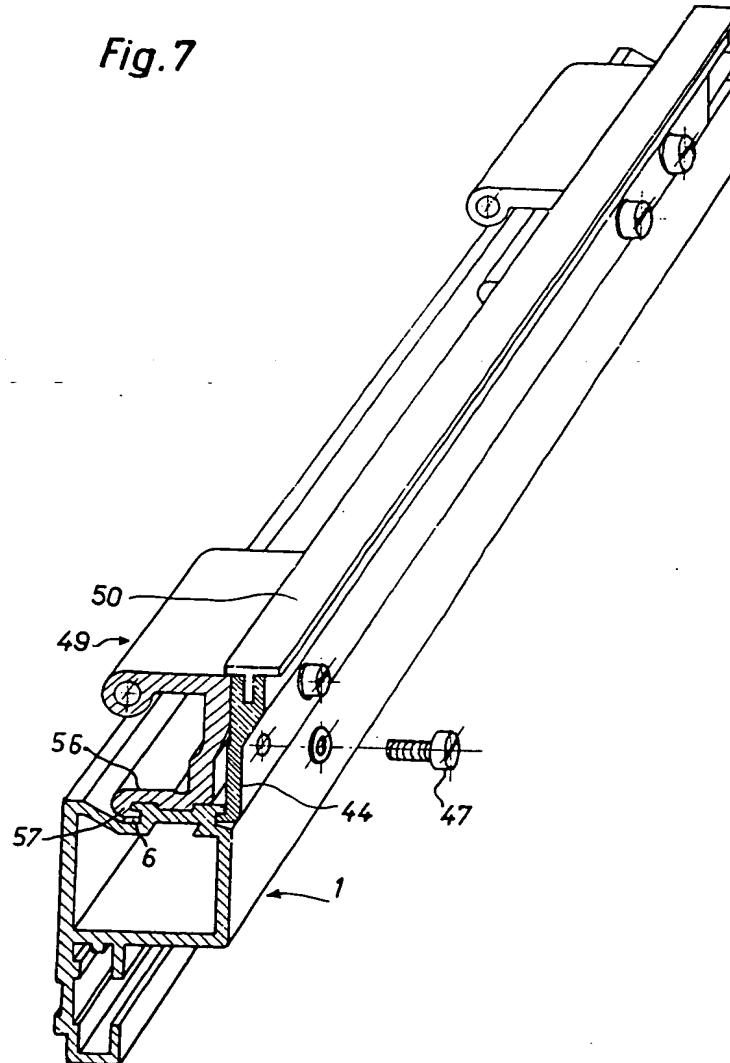
COMPLETE SPECIFICATION

8 SHEETS

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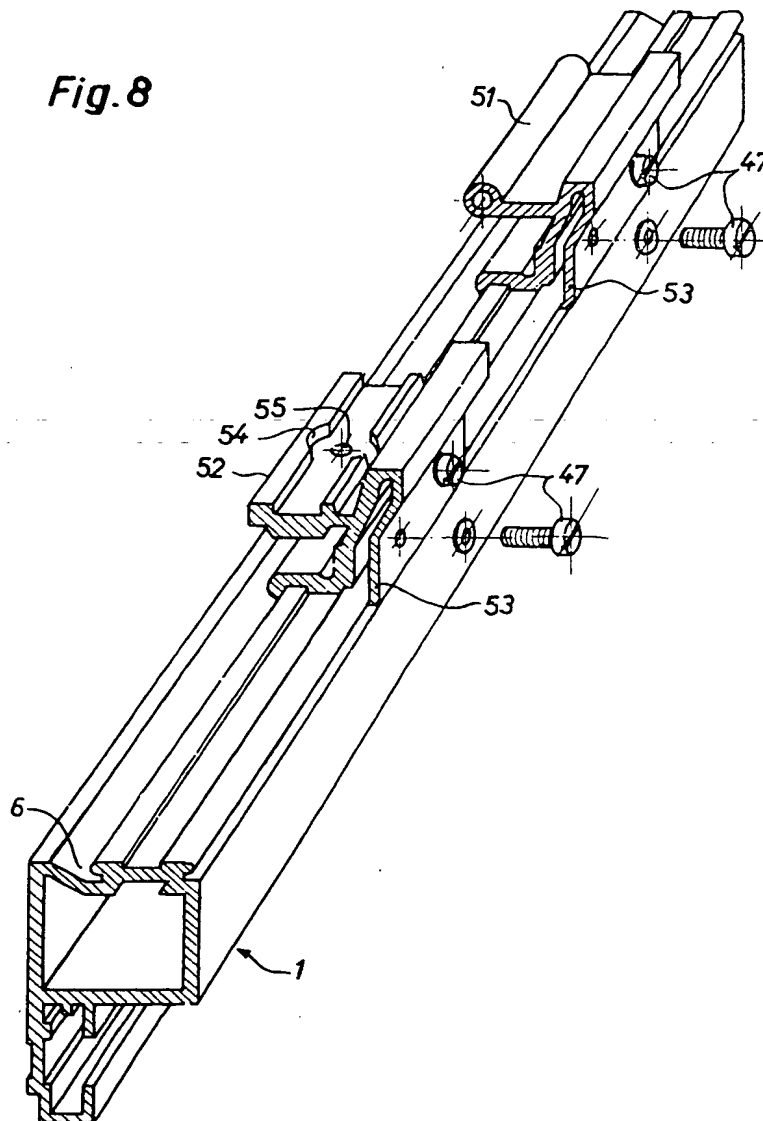
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Fig. 7



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Fig. 8



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